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PATENT APPLICATION

ATTORNEY DOCKET NO. 20001670-4

IN THE  
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Klaus Kehrlé et al.

Confirmation No.: 4640

Application No.: 09/747,678

Examiner: R. R. Yang

Filing Date: December 22, 2000

Group Art Unit: 2672

Title: METHOD FOR INTERACTIVE CONSTRUCTION OF VIRTUAL 3D CIRCUIT MODELS

Mail Stop Appeal Brief-Patents  
Commissioner For Patents  
PO Box 1450  
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed currently herewith.

Applicant believes that no fees are required as Appellant previously paid appeal fees with the Appeal Brief filed on 06-28-2006.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:

☐ 1st Month  
\$120

☐ 2nd Month  
\$450

☐ 3rd Month  
\$1020

☐ 4th Month  
\$1590

☐ The extension fee has already been filed in this application.

☒ (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 08-2025 the sum of 0. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees.

Respectfully submitted,

Klaus Kehrlé et al.

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HEWLETT-PACKARD COMPANY  
Intellectual Property Administration  
P.O. Box 272400  
Fort Collins, Colorado 80527-2400

Docket No.: 20001670-4  
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:  
Klaus Kehrle et al.

Application No.: 09/747,678

Confirmation No.: 4640

Filed: December 22, 2000

Art Unit: 2672

For: METHOD FOR INTERACTIVE  
CONSTRUCTION OF VIRTUAL 3D CIRCUIT  
MODELS

Examiner: R. R. Yang

**SECOND APPEAL BRIEF**

MS Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

As required under § 41.37(a), this brief is filed within two months of the Notice of Appeal filed concurrently herewith, and is in furtherance of said Notice of Appeal.

No fees as set forth under § 41.20(b)(2) are due with this Second Appeal Brief as such fees were paid with the Appeal Brief filed June 28, 2006 which resulted in the Appellee reopening prosecution.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1206:

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|-------|--|
| I.    | Real Party In Interest                                   |
| II    | Related Appeals, Interferences, and Judicial Proceedings |
| III.  | Status of Claims   |
| IV.   | Status of Amendments                                     |
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X.	Related Proceedings
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## **I. REAL PARTY IN INTEREST**

The real party in interest for this appeal is:

Hewlett-Packard Development Company, L.P., a Limited Partnership established under the laws of the State of Texas and having a principal place of business at 20555 S.H. 249, Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC.

## **II. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS**

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

## **III. STATUS OF CLAIMS**

### **A. Total Number of Claims in Application**

There are 18 claims pending in application.

**B. Current Status of Claims**

1. **Claims canceled: 1-10**
2. **Claims withdrawn from consideration but not canceled: None**
3. **Claims pending: 11-28**
4. **Claims allowed: None**
5. **Claims rejected: 11-28**

**C. Claims On Appeal**

The claims on appeal are claims 11-28

**IV. STATUS OF AMENDMENTS**

Appellant did not file an Amendment After Final Rejection, but rather filed a Notice of Appeal and, thereafter, an Appeal Brief. In response to Appellant's Appeal Brief, Appellee reopened prosecution and issued an Office Action dated September 19, 2006 (hereinafter the "present Office Action") rejecting the claims for reasons substantially the same as those set forth in the final Office Action. Appellant is filing this Second Appeal Brief in response to the present Office Action.

**V. SUMMARY OF CLAIMED SUBJECT MATTER**

An embodiment of the invention, as recited in claim 11, provides a method of manipulating computer aided design (CAD) objects. The method comprises receiving user input to associate two CAD objects (page 5, lines 33-37, and first box of Figure 2), wherein the user input identifies a coupling between the two CAD objects (page 8, lines 26-28, and second and third boxes of Figure 2) selected from a group of connections consisting of a vertex-to-vertex connection, an axis-to-axis connection, an edge-to-axis connection, and a face-to-face connection (page 6, lines 19-25). The method further comprises displaying the two CAD objects according to the coupling identified by the user input (page 7, lines 12-13, page 9, lines 5-19, and seventh box of Figure 2), calculating a reduction in degrees of freedom between the two CAD objects caused by the identified coupling (page 6, line 28,

through page 7, line 7, page 7, lines 15-17, page 9, lines 19-22, and eighth through tenth boxes of Figure 2), and displaying an indication of the reduction in the degrees of freedom in association with the display of the two CAD objects (page 7, lines 22-32, box eleven of Figure 2, and Figures 4-11).

An embodiment of the invention, as recited in claim 21, provides a computer aided design (CAD) system. The system comprises means for defining a virtual environment in which CAD objects are manipulated (page 5, lines 21-25). The system further comprises means for receiving input from a user to associate two CAD objects within the virtual environment (page 5, lines 33-37, and first box of Figure 2), wherein said input identifies a coupling between said two CAD objects (page 8, lines 26-28, and second and third boxes of Figure 2) selected from a group of connections consisting of a vertex-to-vertex connection, an axis-to-axis connection, an edge-to-axis connection, and a face-to-face connection (page 6, lines 19-25). The system also comprises means for displaying the two CAD objects according to the identified coupling (page 5, lines 21-25, page 7, lines 12-13, page 9, lines 5-19, and seventh box of Figure 2), means for determining a reduction in degrees of freedom caused by the identified coupling (page 5, lines 21-25, page 6, line 28, through page 7, line 7, page 7, lines 15-17, page 9, lines 19-22, and eighth through tenth boxes of Figure 2), and means for displaying an indication of degrees of freedom associated with the two CAD objects after application of the identified coupling (page 5, lines 21-25, page 7, lines 22-32, box eleven of Figure 2, and Figures 4-11).

An embodiment of the invention, as recited in claim 23, provides a system as set forth above which further comprises means for determining whether the identified coupling is consistent with a prior coupling applied to one of the two CAD objects (page 5, lines 21-25, page 8, lines 9-11, page 8, line 34, through page 9, line 7, and fifth box of Figure 2).

An embodiment of the invention, as recited in claim 25, provides a system as set forth above which further comprises means for applying transformation matrix operations to CAD objects that correspond to user manipulations of the CAD objects (page 5, lines 21-25, page 9, lines 7-19, and sixth and seventh boxes of Figure 2).

An embodiment of the invention, as recited in claim 26, provides a method comprising providing a virtual environment in which computer aided design (CAD) objects are manipulated (page 5, lines 21-32, and Figure 3). The method further comprises receiving input from a user to associate two CAD objects within said virtual environment (page 5, lines

33-37, and first box of Figure 2), wherein said input identifies a coupling selection from predefined connection relationships (page 6, lines 19-25). The method also comprises displaying the two CAD objects according to the identified coupling (page 7, lines 12-13, page 9, lines 5-19, and seventh box of Figure 2), determining a reduction in degrees of freedom caused by the identified coupling (page 6, line 28, through page 7, line 7, page 7, lines 15-17, page 9, lines 19-22, and eighth through tenth boxes of Figure 2), and displaying an indication of degrees of freedom associated with the two CAD objects after application of the identified coupling (page 7, lines 22-32, box eleven of Figure 2, and Figures 4-11).

## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

Whether the rejection of claims 11-15, 21-24, and 26-28 under 35 U.S.C. § 103(a) over Mukouchi et al. is proper.

Whether the rejection of claims 16-19 under 35 U.S.C. § 103(a) over Mukouchi et al. in view of Bentley et al. is proper.

Whether the rejection of claims 20 and 25 under 35 U.S.C. § 103(a) over Mukouchi et al. in view of Noyama is proper.

## **VII. ARGUMENT**

Appellant notes the Appellee's objection to the title first made of record in the present Office Action. Specifically, the Appellee objects to the title "Method for Interactive Construction of Virtual 3D Circuit Models" because the invention is directed to object manipulation in mechanical CAD, which is asserted by the Appellee to have nothing to do with circuits, Office Action at page 2. Appellant respectfully points out that the virtual 3D models constructed using a CAD may be circuit models. Accordingly, the title is asserted to be proper. However, as the virtual 3D models constructed using a CAD in accordance with claimed embodiments of the invention may be models of many items other than circuits, Appellant proposes amending the title after a decision is rendered by the Board in the present appeal. Appellant believes holding such an amendment in abeyance is proper in light of the delay in prosecution already experienced in appealing the present claims.

Claims 11-15, 21-24, and 26-28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Mukouchi et al., United States Patent Number 6,104,403 (hereinafter *Mukouchi*). Claims 16-19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Mukouchi* in view of Bentley et al., United States Patent Number 6,341,291 (hereinafter *Bentley*). Claims 20 and 25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Mukouchi* in view of Noyama, United States Patent Number 5,594,850 (hereinafter *Noyama*). Appellant respectfully traverses the rejections of record.

To establish a *prima facie* case of obviousness, three basic criteria must be met, see M.P.E.P. § 2143. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of the ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the applied reference (or references when combined) must teach or suggest all the claim limitations. Without conceding the second criteria, Appellant respectfully asserts that the references fail to teach or suggest all the claim limitations and that proper motivation for the modifications necessary to meet the claims is not present.

**A. The 35 U.S.C. § 103 Rejections Over Mukouchi**

**1. Claims 11, 12, and 14**

Independent claim 11 recites “calculating a reduction in degrees of freedom between said two CAD objects caused by said identified coupling . . . .” The present Office Action cites Figures 19, 22, and 24, as well as column 6, lines 11-13, and column 15, lines 33-35, of *Mukouchi* as providing disclosure relevant to calculating a reduction in the degrees of freedom, present Office Action at page 3. From this disclosure, the Appellee concludes that “[s]ince the door is hinged after movements, it shows lesser degree of freedom of movement [and s]ince *Mukouchi* teaches the movement of the model . . . , and the movement shows the degree of freedom . . . , it is inherent that *Mukouchi* is calculating for the movement of the object and the degree of freedom,” *id.* However, even assuming *arguendo* that the Appellee’s assertion is accurate, the claim limitation is not met. Specifically, that *Mukouchi* teaches, as asserted by Appellee, movement of the door model and that such movement shows a degree of freedom does not meet the express claim limitation of “calculating a

reduction in degrees of freedom between said two CAD objects caused by said identified coupling . . . .”

Appellee’s position appears to be that since *Mukouchi* teaches assembly of parts into an assembly model, wherein movement between the assembled parts is permitted, that it is inherent that a reduction in degrees of freedom between such parts is calculated. Appellant reminds the Appellee that, in order to properly establish a rejection based on inherency, “the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art,” M.P.E.P. § 2112 (citing *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)) (emphasis original). Simply because movement between the assembled parts is allowed, even assuming that providing such movement included calculation of an available degree of freedom, does not show that calculation of reduction in degrees of freedom necessarily flows from such a disclosure. In support of this position, Appellant points out that *Mukouchi* does not provide any disclosure with respect to the degrees of freedom of the parts before their assembly, nor has the Appellee shown otherwise. In contrast to this lack of disclosure in *Mukouchi*, and consistent with the express language of the claims, the present specification provides detail with respect to the reduction of degrees of freedom according to embodiments of the invention, see e.g., page 10, lines 9-23.

Appellant respectfully asserts that *Mukouchi* teaches away from calculating or determining a reduction in degrees of freedom between two coupled CAD objects. *Mukouchi* states “by virtue of the junction based on the two points . . . there will not be restricted any rotation around the axis which is a line joining the two [coupling] points 116 and 118,” column 15, lines 35-38 (emphasis and bracketed clarification added). This is further confirmed by Figure 24 which shows that object 114 can rotate 360 degrees after object 114 is coupled to object 112. Thus, *Mukouchi* fails to even teach restrictions on movement of the part model in the rotational movement. Such a disclosure cannot fairly be read to teach or suggest “determining a reduction in degrees of freedom caused by said identified coupling” when the disclosure is silent with respect to such degrees of freedom and the only movement discussed is expressly taught to not be restricted by interference of another part.



Claim 11 also recites “displaying an indication of said reduction in said degrees of freedom in association with the display of said two CAD objects.” The present Office Action cites Figure 24 as displaying the calculated reduction in degrees of freedom, present Office Action at pages 3 and 4. Specifically, Appellee identifies the arrow and dashed lines as indications showing the restricted movement after the edges are connected, *id.* Appellant notes that the circular arrow of Figure 24 is part of the patent drawing and is not taught or suggested to be displayed by the system of *Mukouchi*. For example, Figure 24 is not described as representing a display provided by the *Mukouchi* system, but rather is described as “an explanatory diagram,” column 6, lines 10-12. Similarly, the discussion of Figure 24 states that “FIG. 24 illustrates an assembly model appearing after attaching the door part model 114 to the door frame part model 112 at the two junction reference points,” column 15, lines 32-34. There is nothing in the disclosure of *Mukouchi* to teach a method in which CAD objects are displayed with an indication of the reduction in the degrees of freedom caused by their coupling. Moreover, the illustrative representation of movement arrows in a patent figure used to describe a concept in a patent cannot fairly be read to suggest display of a reduction in the degrees of freedom associated with coupled CAD objects.

Moreover, Figure 24 does not show a reduction in the degrees of freedom of the part models therein. Instead, Figure 24 merely shows that the door part model can rotate, without providing any information with respect to whether other degrees of freedom are available or not. The rotational arrow shown in the upper portion of the Figure, shows object 114 still rotating 360 degrees despite it having been coupled to object 112 (see column 15, lines 35-38), and thus does not establish any restrictions with respect to any degree of freedom. Furthermore, as explained above, because *Mukouchi* fails to calculate a reduction in degrees of freedom, *Mukouchi* cannot display a calculated reduction in degrees of freedom.

For at least the above reasons Appellant respectfully asserts that independent claim 11 recites elements that are not taught or suggested by *Mukouchi*. Therefore Appellant respectfully requests withdrawal of the 35 U.S.C. § 103(a) rejections of record of independent claim 11.

Claims 12-15 depend directly or indirectly from claim 11, thereby inheriting all the limitations therein. Thus, for at least the reasons stated above, *Mukouchi* fails to disclose

each and every element of claims 12-15. Accordingly, Appellant respectfully requests withdrawal of the rejections of record of claims 12-15 as well.

Claims 16-19 stand rejected under *Mukouchi* in view of *Bentley*. However, claims 16-19 depend directly or indirectly from independent claim 11 thereby inheriting all limitations therein. As explained above, *Mukouchi* fails to teach each and every claim limitation of claim 11, therefore *Mukouchi* fails to teach all limitations of claims 16-19. Furthermore, the introduction of *Bentley* fails to cure the deficiencies explained above. Accordingly, the cited combination fails to disclose all the limitations of claims 16-19, and Appellant respectfully requests withdrawal of the 35 U.S.C. § 103(a) rejections of record of claim 16-19.

## **2. Claim 13**

Claim 13 recites “verifying that said identified coupling is consistent with a prior coupling between said two CAD objects before performing said displaying said two CAD objects.” The Appellee relies upon column 14, line 41, through column 15, line 9, of *Mukouchi* to meet the claim, present Office Action at page 4. However, the identified portion of *Mukouchi* teaches assembly of previously disconnected (non-coupled) parts, see column 14, lines 41-47, and Figure 15. As such, the rejection of record has not established that *Mukouchi* teaches verifying that the identified coupling is consistent with a prior coupling between the two CAD objects. The rejection of claim 13 under 35 U.S.C. § 103 should therefore be withdrawn.

## **3. Claim 15**

Claim 15 recites “calculating a reduction in degrees of freedom caused by said relative positioning of said two CAD objects . . . .” The rejection of record with respect to claim 15 relies upon the same disclosure of *Mukouchi* relied upon in rejecting claim 11 discussed above, present Office Action at page 5. However, the identified portion of *Mukouchi* is asserted by Appellee to show a reduction in degrees of freedom caused by coupling CAD objects. Claim 15 adds to the limitations of claim 11 that a reduction in degrees of freedom caused by the relative position of CAD objects before their coupling is

calculated. Nothing in the rejection of record nor in the disclosure if *Mukouchi* teaches or suggests the foregoing.

The Appellee asserts that “[b]efore the door is hinged, the door is movable in both lateral and angular direction; afterward, the door is movable only in angular direction, therefore, it is lesser degree of freedom,” present Office Action at page 5. However, even assuming *arguendo* that the Appellee’s assertion is accurate, there is nothing to show that *Mukouchi* calculates a reduction in the degrees of freedom caused by the relative position of CAD objects before their coupling. Accordingly, the 35 U.S.C. § 103 rejection of claim 15 should be withdrawn.

#### 4. Claims 21, 22, and 24

Independent claim 21 recites “determining a reduction in degrees of freedom caused by said identified coupling . . . .” The present Office Action cites Figures 19, 22, and 24, as well as columns , lines 11-13, and column 15, lines 33-35, of *Mukouchi* as disclosing an indirect calculation of a reduction in the degrees of freedom, final Office Action at pages 3 and 6. From this disclosure, the Appellee concludes that “[s]ince the door is hinged after movements, it shows lesser degree of freedom of movement [and s]ince *Mukouchi* teaches the movement of the model . . . , and the movement shows the degree of freedom . . . , it is inherent that *Mukouchi* is calculating for the movement of the object and the degree of freedom,” present Office Action at page 3. However, even assuming *arguendo* that the Appellee’s assertion is accurate, the claim limitation is not met. Specifically, that *Mukouchi* teaches, as asserted by Appellee, movement of the door model and that such movement shows a degree of freedom does not meet the express claim limitation of “determining a reduction in degrees of freedom caused by said identified coupling . . . .”

Appellee’s position appears to be that since *Mukouchi* teaches assembly of parts into an assembly model, wherein movement between the assembled parts is permitted, that it is inherent that a reduction in degrees of freedom between such parts is determined. As stated above, in order to properly establish a rejection based on inherency, “the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art,” M.P.E.P. § 2112 (citing *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. &

Inter. 1990)) (emphasis original). Simply because movement between the assembled parts is allowed, even assuming that providing such movement included determination of an available degree of freedom, does not show that determination of reduction in degrees of freedom necessarily flows from such a disclosure. In support of this position, Appellant points out that *Mukouchi* does not provide any disclosure with respect to the degrees of freedom of the parts before their assembly, nor has the Appellee shown otherwise. In contrast to this lack of disclosure in *Mukouchi*, and consistent with the express language of the claims, the present specification provides detail with respect to the reduction of degrees of freedom according to embodiments of the invention, see e.g., page 10, lines 9-23.

Appellant respectfully asserts that *Mukouchi* teaches away from calculating or determining a reduction in degrees of freedom between two coupled CAD objects. *Mukouchi* states “by virtue of the junction based on the two points . . . there will not be restricted any rotation around the axis which is a line joining the two [coupling] points 116 and 118,” column 15, lines 35-38 (emphasis and bracketed clarification added). This is further confirmed by Figure 24 which shows that object 114 can rotate 360 degrees after object 114 is coupled to object 112. Thus, *Mukouchi* fails to even teach restrictions on movement of the part model in the rotational movement. Such a disclosure cannot fairly be read to teach or suggest “determining a reduction in degrees of freedom caused by said identified coupling” when the disclosure is silent with respect to such degrees of freedom and the only movement discussed is expressly taught to not be restricted by interference of another part.

Claim 21 also recites “displaying an indication of degrees of freedom associated with said two CAD objects after application of said identified coupling.” The present Office Action cites Figure 24 as displaying an indication of degrees of freedom associated with the assembled parts, present Office Action at pages 3, 4, and 6. Specifically, Appellee identifies the arrow and dashed lines as indications showing the restricted movement after the edges are connected, *id.* Appellant notes that the circular arrow of Figure 24 is part of the patent drawing and is not taught or suggested to be displayed by the system of *Mukouchi*. For example, Figure 24 is not described as representing a display provided by the *Mukouchi* system, but rather is described as “an explanatory diagram,” column 6, lines 10-12. Similarly, the discussion of Figure 24 states that “FIG. 24 illustrates an assembly model appearing after attaching the door part model 114 to the door frame part model 112 at the two

junction reference points,” column 15, lines 32-34. There is nothing in the disclosure of *Mukouchi* to teach a method in which CAD objects are displayed with an indication of the reduction in the degrees of freedom caused by their coupling. Moreover, the illustrative representation of movement arrows in a patent figure used to describe a concept in a patent cannot fairly be read to suggest display of a reduction in the degrees of freedom associated with coupled CAD objects.

For at least the above reasons Appellant respectfully asserts that independent claim 21 recites elements that are not taught or suggested by *Mukouchi*. Therefore Appellant respectfully requests withdrawal of the 35 U.S.C. § 103(a) rejections of record of independent claim 21.

Claims 22-24 depend directly or indirectly from claim 21 thereby inheriting all the limitations therein. Thus, for at least the reasons stated above, *Mukouchi* fails to disclose each and every element of claims 22-24. Accordingly, Appellant respectfully requests withdrawal of the rejections of record of claims 22-24 as well.

#### **5. Claim 23**

Claim 23 recites “determining whether said identified coupling is consistent with a prior coupling applied to one of said two CAD objects.” The Appellee relies upon column 14, line 41, through column 15, line 9, of *Mukouchi* to meet the claim, present Office Action at pages 4 and 6. The identified portion of *Mukouchi* teaches assembly of previously disconnected (non-coupled) parts without any reference to a prior coupling applied to any of the CAD objects, see column 14, lines 41-47, and Figure 15. As such, the rejection of record has not established that *Mukouchi* teaches determining whether the identified coupling is consistent with a prior coupling applied to one of the CAD objects. The rejection of claim 23 under 35 U.S.C. § 103 should therefore be withdrawn.

#### **6. Claims 26-28**

Independent claim 26 recites “determining a reduction in degrees of freedom caused by said identified coupling . . . .” The present Office Action cites Figures 19, 22, and 24, as well as columns , lines 11-13, and column 15, lines 33-35, of *Mukouchi* as disclosing an

indirect calculation of a reduction in the degrees of freedom, final Office Action at pages 3 and 6. From this disclosure, the Appellee concludes that “[s]ince the door is hinged after movements, it shows lesser degree of freedom of movement [and s]ince *Mukouchi* teaches the movement of the model . . . , and the movement shows the degree of freedom . . . , it is inherent that *Mukouchi* is calculating for the movement of the object and the degree of freedom,” present Office Action at page 3. However, even assuming *arguendo* that the Appellee’s assertion is accurate, the claim limitation is not met. Specifically, that *Mukouchi* teaches, as asserted by Appellee, movement of the door model and that such movement shows a degree of freedom does not meet the express claim limitation of “determining a reduction in degrees of freedom caused by said identified coupling . . . .”

Appellee’s position appears to be that since *Mukouchi* teaches assembly of parts into an assembly model, wherein movement between the assembled parts is permitted, that it is inherent that a reduction in degrees of freedom between such parts is determined. As stated above, in order to properly establish a rejection based on inherency, “the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art,” M.P.E.P. § 2112 (citing *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)) (emphasis original). Simply because movement between the assembled parts is allowed, even assuming that providing such movement included determination of an available degree of freedom, does not show that determination of reduction in degrees of freedom necessarily flows from such a disclosure. In support of this position, Appellant points out that *Mukouchi* does not provide any disclosure with respect to the degrees of freedom of the parts before their assembly, nor has the Appellee shown otherwise. In contrast to this lack of disclosure in *Mukouchi*, and consistent with the express language of the claims, the present specification provides detail with respect to the reduction of degrees of freedom according to embodiments of the invention, see e.g., page 10, lines 9-23.

Appellant respectfully asserts that *Mukouchi* teaches away from calculating or determining a reduction in degrees of freedom between two coupled CAD objects. *Mukouchi* states “by virtue of the junction based on the two points . . . there will not be restricted any rotation around the axis which is a line joining the two [coupling] points 116 and 118,” column 15, lines 35-38 (emphasis and bracketed clarification added). This is further

confirmed by Figure 24 which shows that object 114 can rotate 360 degrees after object 114 is coupled to object 112. Thus, *Mukouchi* fails to even teach restrictions on movement of the part model in the rotational movement. Such a disclosure cannot fairly be read to teach or suggest “determining a reduction in degrees of freedom caused by said identified coupling” when the disclosure is silent with respect to such degrees of freedom and the only movement discussed is expressly taught to not be restricted by interference of another part.

Claim 26 also recites “displaying an indication of degrees of freedom associated with said two CAD objects after application of said identified coupling.” The present Office Action cites Figure 24 as displaying an indication of degrees of freedom associated with the assembled parts, present Office Action at pages 3, 4, and 6. Specifically, Appellee identifies the arrow and dashed lines as indications showing the restricted movement after the edges are connected, *id.* Appellant notes that the circular arrow of Figure 24 is part of the patent drawing and is not taught or suggested to be displayed by the system of *Mukouchi*. For example, Figure 24 is not described as representing a display provided by the *Mukouchi* system, but rather is described as “an explanatory diagram,” column 6, lines 10-12. Similarly, the discussion of Figure 24 states that “FIG. 24 illustrates an assembly model appearing after attaching the door part model 114 to the door frame part model 112 at the two junction reference points,” column 15, lines 32-34. There is nothing in the disclosure of *Mukouchi* to teach a method in which CAD objects are displayed with an indication of the reduction in the degrees of freedom caused by their coupling. Moreover, the illustrative representation of movement arrows in a patent figure used to describe a concept in a patent cannot fairly be read to suggest display of a reduction in the degrees of freedom associated with coupled CAD objects.

For at least the above reasons Appellant respectfully asserts that independent claim 26 recites elements that are not taught or suggested by *Mukouchi*. Therefore Appellant respectfully requests withdrawal of the 35 U.S.C. § 103(a) rejections of record of independent claim 26.

Claims 27 and 28 depend directly or indirectly from claim 26 thereby inheriting all the limitations therein. Thus, for at least the reasons stated above, *Mukouchi* fails to disclose

each and every element of claims 27 and 28. Accordingly, Appellant respectfully requests withdrawal of the rejections of record of claims 27 and 28, as well.

**7. Claim 28**

Claim 28 recites “determining whether said coupling identified by said user is consistent with prior couplings applied to one of said two CAD objects.” The Appellee relies upon column 14, line 41, through column 15, line 9, of *Mukouchi* to meet the claim, final Office Action at pages 4 and 7. The identified portion of *Mukouchi* teaches assembly of previously disconnected (non-coupled) parts without any reference to a prior coupling applied to any of the CAD objects, see column 14, lines 41-47, and Figure 15. As such, the rejection of record has not established that *Mukouchi* teaches determining whether the identified coupling is consistent with a prior coupling applied to one of the CAD objects. The rejection of claim 28 under 35 U.S.C. § 103 should therefore be withdrawn.

**B. The 35 U.S.C. § 103 Rejections Over Mukouchi In View Of Bentley**

**1. Claim 16**

Claim 16 recites “wherein said receiving, displaying said two CAD objects, calculating, and displaying an indication are performed by a collaborative design application associated with a plurality of users.” The Appellee relies upon the disclosure of *Bentley* to meet the foregoing. However, the applied art must suggest the desirability of the claimed invention, see e.g., *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1457-58 (Fed. Cir. 1998), and the fact that references can be combined or modified is not sufficient to establish a *prima facie* case of obviousness, see e.g., *In re Mills*, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990). The Appellee’s assertion that “it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of *Bentley* into *Mukouchi* because *Mukouchi* discloses a method of changing the relative position and/or orientation of two components of a virtual model and *Bentley* discloses the CAD data be shared in a network environment in order to be used by a plurality of users,” present Office Action at page 7, is merely a statement that the references can be combined, without providing any objective reason as to why one of ordinary skill in the art would have found such a modification obvious from the



disclosures thereof. As such, the rejection of record does not properly establish that the claim is obvious under 35 U.S.C. § 103.

Claims 17-19 depend from claim 16, thereby inheriting all the limitations therein. Thus, for at least the reasons stated above, *Mukouchi* in view of *Bentley* fails to disclose each and every element of claims 17-19. Accordingly, Appellant respectfully requests withdrawal of the rejections of record of claims 17-19 as well.

## 2. Claim 17

Claim 17 recites “wherein said displaying said two CAD objects and displaying said indication are performed by communicating only changes in said virtual model caused by said identified coupling.” The rejection of record relies upon the disclosure of *Bentley* to meet the foregoing. Specifically, the Appellee relies upon *Bentley* disclosing that “Each client computer may obtain the current version of the components and may send locally edited versions of the components back to the server to replace the current versions in the repository,” and concluding that “the locally edited version is considered a portion of the original image,” to meet the claim, present Office Action at page 8. However, the foregoing does not meet the express language of the claim requiring communicating only changes in said virtual model. Accordingly, the 35 U.S.C. § 103 rejection of record with respect to claim 17 is improper.

As with the rejection of claim 16, discussed above, the motivation provided with respect to the rejection of claim 17 is that “it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of *Bentley* into *Mukouchi* because *Mukouchi* discloses a method of changing the relative position and/or orientation of two components of a virtual model and *Bentley* discloses the CAD data be shared in a network environment in order to be used by a plurality of users,” present Office Action at page 8. However, the foregoing is merely a statement that the references can be combined, without providing any objective reason as to why one of ordinary skill in the art would have found such a modification obvious from the disclosures thereof. The fact that references can be combined or modified is not sufficient to establish a *prima facie* case of obviousness, see e.g., *In re Mills*, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990). As such, the

rejection of record does not properly establish that the claim is obvious under 35 U.S.C. § 103.

### 3. Claim 18

Claim 18 recites “locking one of said two CAD objects in response to user input from a respective user, prior to receiving user input to associate two CAD objects, to prevent other users from manipulating said locked CAD object.” The rejection of record relies upon *Bentley* disclosing “If there are unresolved conflicts, that is, components that have been modified and committed by another user and have also been changed locally, then commit is blocked,” and concluding that “blocked commit is considered locking . . . to prevent,” to meet the claim, final Office Action at pages 8 and 9. However, the foregoing disclosure of *Bentley* does not address the express limitation of locking one of the two CAD objects prior to receiving user input to associate two CAD objects. Moreover, the disclosure of *Bentley* appears to teach away from the foregoing, teaching that conflicts are resolved after changes are made by the users, see column 14, lines 60-65. As such, the 35 U.S.C. § 103 rejection of claim 18 is improper and should be withdrawn.

Moreover, the applied art must suggest the desirability of the claimed invention, see e.g., *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1457-58 (Fed. Cir. 1998), and the fact that references can be combined or modified is not sufficient to establish a *prima facie* case of obviousness, see e.g., *In re Mills*, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990). The Appellee’s assertion that “it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of *Bentley* into *Mukouchi* because *Mukouchi* discloses a method of changing the relative position and/or orientation of two components of a virtual model and *Bentley* discloses usage by other user can be blocked in order to avoid conflict,” final Office Action at page 8, is merely a statement that the references can be combined, without providing any objective reason as to why one of ordinary skill in the art would have found such a modification obvious from the disclosures thereof. As such, the rejection of record does not properly establish that the claim is obvious under 35 U.S.C. § 103.

#### 4. Claim 19

Claim 19 recites “unlocking said one of said two CAD objects after displaying said two CAD objects according to the identified coupling.” The Appellee asserts that “since the lock signal is established to prevent changes by the other, it is obvious the lock signal is removed after change has been made in order to prevent hanging of the system,” present Office Action at page 9. The foregoing fails to properly establish a rejection under 35 U.S.C. § 103 for a number of reasons.

As discussed above with respect to claim 18, *Bentley* teaches that conflicts are resolved after changes are made by the users, see column 14, lines 60-65, rather than locking CAD objects. As such, it does not follow that a lock signal is removed after a change has been made.

Moreover, even assuming *arguendo* that the Appellee’s assertion were correct, the claim limitation is not met. Specifically, there is nothing in the rejection of record to show that *Bentley* releases a lock signal after displaying the two CAD objects according to the identified coupling.

Appellant further asserts that the Appellee has not properly set forth grounds for a rejection under 35 U.S.C. § 103. The Appellee states that “it is obvious the lock signal is removed after change has been made in order to prevent hanging of the system,” present Office Action at page 9. If the foregoing is an attempt to establish obviousness under 35 U.S.C. § 103, the requirements of such a rejection have not been made of record, see *Graham v. John Deere and Co.*, 383 U.S. 1 (1966). Alternatively, if the foregoing is an attempt to establish that the claim limitation is inherent, the requirements of such a rejection also have not been made of record. In order to properly establish a rejection based on inherency, “the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art,” M.P.E.P. § 2112 (citing *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)) (emphasis original). Clearly, a lock signal may be released at any time, and not necessarily after displaying the two CAD objects according to the identified coupling. As such, the 35 U.S.C. § 103 rejection of claim 19 is improper and should be withdrawn.

**C. The 35 U.S.C. § 103 Rejections Over Mukouchi In View Of Noyama****1. Claim 20**

Claim 20 stands rejected under *Mukouchi* in view of *Noyama*. However, claim 20 depends directly from independent claim 11 and thereby inherits all the limitations thereof. As explained above, *Mukouchi* fails to teach each and every limitation of claim 11. Therefore, *Mukouchi* fails to teach all the limitations of claim 20. Furthermore, the introduction of *Noyama* fails to cure any deficiencies explained above. Accordingly, because the cited combination fails to teach all the limitations of claim 20, Appellant respectfully requests withdrawal of the 35 U.S.C. § 103(a) rejections of record.

Moreover, the applied art must suggest the desirability of the claimed invention, see e.g., *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1457-58 (Fed. Cir. 1998), and the fact that references can be combined or modified is not sufficient to establish a *prima facie* case of obviousness, see e.g., *In re Mills*, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990). The Appellee's assertion that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of *Noyama* into *Mukouchi* because *Mukouchi* discloses a method of changing the relative position and/or orientation of two components of a virtual model and *Noyama* discloses a transformation matrix between two images can be calculated in order to facilitate the transformation," present Office Action at pages 9 and 10, is merely a statement that the references can be combined, without providing any objective reason as to why one of ordinary skill in the art would have found such a modification obvious from the disclosures thereof. As such, the rejection of record does not properly establish that the claim is obvious under 35 U.S.C. § 103.

**2. Claim 25**

Claim 25 stands rejected under *Mukouchi* in view of *Noyama*. However, claim 25 depends from independent claim 21 and thus inherits all the limitations of this base claim. As explained above, *Mukouchi* fails to teach each and every limitation of claim 21. Therefore, *Mukouchi* fails to teach all the limitations of claim 25. Furthermore, the introduction of *Noyama* fails to cure any deficiencies explained above. Accordingly, because the cited combination fails to teach all the limitations of claim 25, Appellant respectfully requests withdrawal of the 35 U.S.C. § 103(a) rejections of record.

Moreover, the applied art must suggest the desirability of the claimed invention, see e.g., *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1457-58 (Fed. Cir. 1998), and the fact that references can be combined or modified is not sufficient to establish a *prima facie* case of obviousness, see e.g., *In re Mills*, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990). The Appellee's assertion that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of *Noyama* into *Mukouchi* because *Mukouchi* discloses a method of changing the relative position and/or orientation of two components of a virtual model and *Noyama* discloses a transformation matrix between two images can be calculated in order to facilitate the transformation," final Office Action at pages 9 and 10, is merely a statement that the references can be combined, without providing any objective reason as to why one of ordinary skill in the art would have found such a modification obvious from the disclosures thereof. As such, the rejection of record does not properly establish that the claim is obvious under 35 U.S.C. § 103.

#### **VIII. CLAIMS**

A copy of the claims involved in the present appeal is attached hereto as Appendix A. As indicated above, the claims in Appendix A do not include any amendments after the final rejection.

#### **IX. EVIDENCE**

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted. Accordingly, Appendix B herein does not include any evidence.

**X. RELATED PROCEEDINGS**

No related proceedings are referenced in II. above, or copies of decisions in related proceedings are not provided. Accordingly, Appendix C herein does not include any information with respect to related proceedings.

Respectfully submitted,

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## **APPENDIX A**

### **Claims**

11. A method of manipulating computer aided design (CAD) objects, comprising:  
receiving user input to associate two CAD objects, wherein said user input identifies a coupling between said two CAD objects selected from a group of connections consisting of: a vertex-to-vertex connection, an axis-to-axis connection, an edge-to-axis connection, and a face-to-face connection;

displaying said two CAD objects according to the coupling identified by the user input;

calculating a reduction in degrees of freedom between said two CAD objects caused by said identified coupling; and

displaying an indication of said reduction in said degrees of freedom in association with the display of said two CAD objects.

12. The method of claim 11 wherein at least one of said two CAD objects comprises a group of subcomponents.

13. The method of claim 11 further comprising:  
verifying that said identified coupling is consistent with a prior coupling between said two CAD objects before performing said displaying said two CAD objects.

14. The method of claim 11 further comprising:  
receiving user input to position said two CAD objects relative to each other before receiving said user input that identifies a coupling between said two CAD objects; and  
displaying said two CAD objects according to relative positioning.

15. The method of claim 14 further comprising:  
calculating a reduction in degrees of freedom caused by said relative positioning of said two CAD objects; and

displaying said reduction in degrees of freedom in association with display of said two CAD objects.

16. The method of claim 11 wherein said receiving, displaying said two CAD objects, calculating, and displaying an indication are performed by a collaborative design application associated with a plurality of users.

17. The method of claim 16 wherein said collaborative design application maintains a virtual model including said two CAD objects, and wherein said displaying said two CAD objects and displaying said indication are performed by communicating only changes in said virtual model caused by said identified coupling.

18. The method of claim 16 further comprising:  
locking one of said two CAD objects in response to user input from a respective user, prior to receiving user input to associate two CAD objects, to prevent other users from manipulating said locked CAD object.

19. The method of claim 16 further comprising:  
unlocking said one of said two CAD objects after displaying said two CAD objects according to the identified coupling.

20. The method of claim 11 wherein said displaying said two CAD objects comprises:

applying a transformation matrix to at least one of said two CAD objects.

21. A computer aided design (CAD) system, comprising:  
means for defining a virtual environment in which CAD objects are manipulated;  
means for receiving input from a user to associate two CAD objects within said virtual environment, wherein said input identifies a coupling between said two CAD objects selected from a group of connections consisting of: a vertex-to-vertex connection, an axis-to-axis connection, an edge-to-axis connection, and a face-to-face connection;  
means for displaying said two CAD objects according to the identified coupling;  
means for determining a reduction in degrees of freedom caused by said identified coupling; and  
means for displaying an indication of degrees of freedom associated with said two CAD objects after application of said identified coupling.



22. The CAD system of claim 21 wherein at least one of said two CAD objects comprises a plurality of subcomponents mutually associated using respective couplings.

23. The CAD system of claim 21 further comprising:  
means for determining whether said identified coupling is consistent with a prior coupling applied to one of said two CAD objects.

24. The CAD system of claim 21 further comprising:  
means for receiving input from said user to position said two CAD objects relative to each other; and  
means for displaying said two CAD objects according to relative positioning.

25. The CAD system of claim 21 further comprising:  
means for applying transformation matrix operations to CAD objects that correspond to user manipulations of said CAD objects.

26. A method, comprising:  
providing a virtual environment in which computer aided design (CAD) objects are manipulated;  
receiving input from a user to associate two CAD objects within said virtual environment, wherein said input identifies a coupling selection from predefined connection relationships;  
displaying said two CAD objects according to the identified coupling;  
determining a reduction in degrees of freedom caused by said identified coupling; and  
displaying an indication of degrees of freedom associated with said two CAD objects after application of said identified coupling.

27. The method of claim 26 wherein at least one of said two CAD objects comprises a plurality of subcomponents mutually associated using respective couplings.

28. The method of claim 27 further comprising:  
determining whether said coupling identified by said user is consistent with prior couplings applied to one of said two CAD objects.

**APPENDIX B**

**Evidence**

None.

**APPENDIX C**

**Related Proceedings**

None.